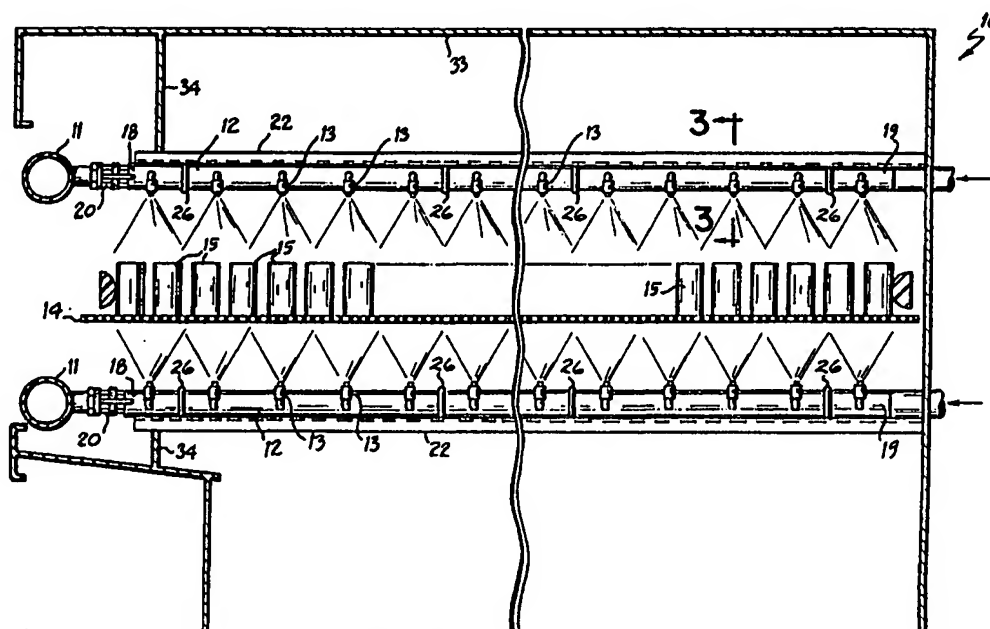




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(54) Title: CAN WASHING APPARATUS WITH PLASTIC RISERS



(57) Abstract

A can washing apparatus (10) includes a supply line (11) or header connected to a plurality of risers (12). The risers (12) are formed from a plastic material and are held to the frame of the can washing apparatus by an elongated metal support (22) which is in turn welded to the frame of the can washing apparatus. The metal support (22) absorbs the force of the spray (31) thereby preventing the risers (12) from moving and flexing during use.

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CAN WASHING APPARATUS WITH PLASTIC RISERS

Background of the Invention

The present invention generally relates to spray washing systems and more particularly to container washing apparatus including one or more liquid supply lines, each having a series of spray
5 nozzles._

Conventional container washing systems utilize a large quantity of spray nozzles, often several hundreds or thousands in number, extending from sides of risers or supply lines. Supply lines
10 are mounted both above and below a liquid permeable conveyor formed of an open mesh material such as plastic or stainless steel. The conveyor moves the containers past the spray nozzles. In such container washing systems, the containers may move along a path often stretching over 100 feet long and pass many different washing,
15 rinsing and treating stations of the system. The spray nozzles at washing and rinsing stations are usually of the type that discharge an elongated, narrow fan spray toward a desired location. Pressurized

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fan sprays are very effective for washing operations. When oriented correctly and precisely, the use of fan sprays results in full efficient spray coverage and prevents cans from being dislodged or knocked over on the conveyor. The fluid sprays above and below the cans must be precisely aligned in order to prevent the cans from being knocked over and to guarantee proper spray coverage and consequently clean cans.

Maintenance of such systems is extremely difficult. Generally, the sprays extend from the risers at 90° and thus, angled fittings are required. Such angled fittings are disclosed, for example, in U.S. Patent No. 5,564,448. This patent discloses an apparatus adapted to permit easy removal of the nozzles from the risers. However, the risers are all formed from metal, generally eight to ten feet long. Removal of the risers for maintenance purposes requires at least two or three individuals. It would be desirable to replace the risers with plastic to permit cleaning. Further plastic is corrosion resistant and therefore has a longer life and is less likely to foul. Unfortunately, container washing systems operate at relatively high temperatures and the force of the spray in combination with the high temperature softening of the plastic would cause the risers to move excessively. This in turn would cause the fluid sprays to be misaligned and in turn, knocking the cans over as they pass the washing apparatus.

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Summary of the Invention

Accordingly, it is an object of the present invention to provide a can washing apparatus which includes plastic risers. Further, it is an object of the present invention to provide such an apparatus wherein the plastic risers can be easily removed and wherein the plastic risers are prevented from moving around during use.

The objects and advantages of the present invention are achieved by utilization of a plastic riser which is clamped to an elongated metal support bracket along the entire length of the riser. The metal support bracket in turn is mounted to the can washing apparatus, preventing its movement. Preferably the bracket is mounted to the riser on the side opposite the direction of the fan spray, thus, absorbing all of the force from the fluid spray. Thus, the riser of the present invention can be simply disconnected from the bracket and subsequently from the header or main supply line permitting it to be easily removed by one individual. The objects and advantages of the present invention will be further appreciated in light of the following detailed description and drawings.

Brief Description of the Drawings

FIG. 1 is a cross-sectional view of a typical can washing apparatus utilizing the present invention;

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FIG. 2 is an overhead cross-sectional view broken away
of a can washing apparatus;

5 FIG. 3 is a cross-sectional view taken at lines 3-3 of FIG.
1;

FIG. 4 is a cross-sectional view of an alternate
embodiment of the present invention; similar to FIG. 3;

10 FIG. 5 is a cross-sectional view of an alternate
embodiment of the present invention;

FIG. 6 is a partial side elevational view of a riser
partially broken away as it is being connected to a header;

15 FIG. 7 is the riser shown in FIG. 6 attached to the
header;

FIG. 8 is a cross-section view taken at lines 8-8 of FIG.
5 .

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Detailed Description of the Apparatus

As shown in FIG. 1 there is a can washing apparatus 10 which includes a main supply, or header 11. A plurality of supply lines or risers 12 extend from the header and each of the risers have a plurality of spray nozzles 13. The risers and supply lines extend from above and below a conveyor 14 which supports a plurality of cans 15. As they move along in a direction 16, fluid is supplied to the header 11 through a supply line 17.

The individual risers 12 are all substantially the same. Each riser includes a first end 18 which connects to the header 11 and an opposite closed end 19. A quick-disconnect or compression fitting 20 connects the riser to the supply line 11. Thus, fluid can flow from the supply lines 17 to the header 11 and to the risers 12 where it is dispensed through nozzles 13 onto the cans 15 conveyed between the risers. The drawing shows an offset cam compression fitment. The fitting 20 can be any of a variety of different fittings.

The risers themselves are formed from a plastic material, preferably polyethylene or polypropylene although other plastics or other lightweight corrosion resistant materials can be employed. The risers are, in turn, connected to an elongated support 22. Elongated support 22 runs substantially along the entire length of the risers. This, as shown in FIG. 3, is a U-shaped bracket which includes a base 23 and two legs 24, 25. The risers are connected to the base

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23 by a plurality of U-bolts 26 fastened with nuts 27. Extending horizontally from either side of the riser are distribution tubes 28 which in turn are connected to angled fittings 29. Nozzles 30 are then attached to the outlet end of the angled fittings 29. Alternately,

5 the angled fitting and nozzle can be replaced by an angled nozzle as disclosed in U.S. Patent No. 5,564,448. As shown in FIG. 3, this fluid spray extends from the nozzles in a direction shown by arrows 31. The support 22 is fastened to the side of riser 12 which is opposite the direction of the fluid spray so that the force from the

10 fluid spray is absorbed by base 23. The support 22 itself is held to the frame 33 of the can washing apparatus 10 by one or more arms 34 welded to the frame 33 and to support 22.

In operation, the cans 15 are transported on a conveyor 14 in the direction shown by arrow 16. Fluid spray is forced from

15 the nozzles 13 in the direction of arrows 31 from both above and below the cans. Since the conveyor itself is perforated, fluid easily flows through the conveyor striking the cans. The fluid itself is relatively hot and although this will cause softening of the plastic risers, the elongated support 22 will prevent the risers from moving.

20 The force of the fluid is directly opposite the support member 22 so that the support member 22 counteracts all the force from the fluid preventing movement of the riser. The support can be replaced by two or more separate supports as desired. However, a single support

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is preferred.

FIG. 4 shows an alternate embodiment of the present invention. In this embodiment the riser 40 itself has a first and second channel 41 and 42. The support member 43 is a C-shaped metal member which has edges 45 and 46 which extend into grooves 41 and 42 holding the riser 40 in position. Therefore, the U-bolts used in the first embodiment of the present invention are not required. The riser simply slides into the channel formed by support member 43 with the edges resting in grooves 40, 41 and 42. In this embodiment, the angled nozzles 44 are employed connected to distribution tubes 47, in turn, screwed into side walls 48 of riser 40. The support member itself 43 is attached by arms 34 to the frame 33 of the can washing apparatus 10 as previously described with the first embodiment of the present invention.

Another alternate embodiment of the present invention is shown in FIG. 5. In this embodiment there is a can washing apparatus 50 which is basically a mirror image of can washing apparatus 10. In this embodiment upper and lower header 51 and 52 are located toward inner wall 53 of the apparatus 50. Like can washing apparatus 10, it includes a conveyor 54 which conveys cans 55 between upper and lower risers 56 and 57 respectively. The risers all include a plurality of nozzles 58 which direct a spray upon the cans 55 as they are passed between the risers.

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Upper and lower risers 56 and 57 include inner ends 61 and outer second ends 62. As shown, headers 51 and 52 each include a female receptacles 63. The inner ends 61 of the risers 56 and 57 are complementary male fittings 67 each including a plurality of o-rings 64. See FIG. 6 and FIG. 7.

The risers 56 and 57 are supported by an elongated aligning brackets 66. The aligning brackets can either be of the same configuration as the bracket 43 shown in FIG. 4 or alternately can be a bracket such as bracket 69 shown in FIG. 8. With either of these brackets, the risers are precisely aligned by the edges of the bracket. With respect to the embodiment shown in FIG. 4, the flanges 45 and 46 which extend into grooves 41 and 42 precisely align the risers. With respect to the embodiment shown in FIG. 8, the side edges 71 and 72 of bracket 69 engaged the tubular portions 73 and 74 which lead to the nozzles. The riser itself is held to the bracket 69 by U-bolts 75. The outside end 76 of bracket 69 or bracket 43 includes a spring-loaded stop-pin 78. (See FIGS. 5, 6 and 7).

As shown in FIG. 6 and FIG. 7, the risers 56 and 57 attach to the headers by inserting the male portion 67 into the female receptacles 63. The o-rings 64 will maintain a tight seal. As the riser slides along the bracket, the spring-loaded pin 78 is in a raised position as shown in FIG. 6. As outer end 62 of riser passes beyond the pin 78, the pin is forced downwardly by spring 79 into a locked

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position shown in FIG. 7. Thus, the end 62 of risers 56 and 57 will engage the pin preventing the riser from being forced off of the header by water pressure.

5 With the embodiment shown in FIG. 8, once the risers are connected to the header the U-bolts would then be fastened holding the riser in position. The bracket 69 will maintain the riser in a straight orientation in the precisely desired location with the axial position of the riser and specifically the nozzles maintained in the desired location by engagement of the edges 72 and 71 of bracket
10 69.

This permits one to remove the risers without access to the header and at the same time maintain the risers in precise alignment which eliminates the need for any type of guiding fastener in the connection between the riser and the header. Likewise this
15 eliminates the need for any cam fitting as shown in the embodiment in FIG. 1.

This allows a single individual to remove the riser and is particularly suitable for plastic risers although the same embodiment can be used for metal risers. Further, it permits the header to be
20 formed from plastic. This greatly reduces the amount of metal in the can washing apparatus. This is preferred since the plastic is more suitable for the environment of the can washing apparatus.

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With either embodiment of the present invention, the plastic riser is held along substantially its entire length by a rigid support which does not need to be removed from the can washing apparatus in order to clean the riser. Thus, the riser can simply be
5 disconnected from the support member and removed using the quick-disconnect fitting holding it to the header. The riser itself is light enough that it can easily be removed by a single individual. This significantly reduces the cost of maintenance and makes it easier to provide maintenance on the equipment.

10 This has been a description of the present invention along with the best mode of practicing the invention known to the inventor, however, the invention itself should be defined only by the appended claims wherein:

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We claim :

1. A can washing apparatus comprising
a header;
a plurality of plastic risers in fluid communication with
5 said header;
a plurality of nozzles extended from said risers;
a metal support extended along said riser, said support
mounted to said washing apparatus wherein said riser is
held firmly against said metal support thereby
10 preventing said riser from flexing during use.

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2. The apparatus claimed in Claim 1 wherein said support is a U-shaped channel.
3. The apparatus claimed in Claim 2 wherein said support is held to a frame of said apparatus by at least one arm.
- 5 4. The apparatus claimed in Claim 2 wherein said riser is connected to said channel with a plurality of U-shaped connectors.
- 10 5. The apparatus claimed in Claim 2 wherein said nozzles are directed in a first direction wherein said riser is mounted with a side of said riser opposite said first direction fixed to said channel.
6. The apparatus claimed in Claim 1 wherein said risers are held to said header with quick-disconnect fittings.
- 15 7. The apparatus claimed in Claim 1 further comprising a plastic fluid supply line connected to said header.

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8. A spray washing apparatus comprising a conveyor and a plurality of spray nozzles above and below said conveyor;

wherein said nozzles are mounted to risers tubes;

5

said riser tubes having first and second ends, said first ends connected to a header by sliding said riser tubes in a first axial direction into complimentary openings in said header;

10

wherein said riser tubes are supported relative to said conveyor and aligned relative to said conveyor by a bracket said bracket preventing relative rotation of said riser tubes.

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9. The washing apparatus claimed in claim 8 further comprising stop members at second ends of said riser tubes preventing said riser tubes from separating from said header.
- 5 10. The washing apparatus claimed in claim 8 wherein said first ends of said riser tubes are adapted to fit within tubular openings in said headers.
11. The washing apparatus claimed in claim 9 wherein said stop members are attached to said brackets.
- 10 12. The washing apparatus claimed in claim 9 wherein said stop members comprise retractable stop members.
13. The can washing apparatus claimed in claim 12 wherein said stop members comprise spring loaded pins.
- 15 14. The can washing apparatus claimed in claim 8 wherein said nozzles extend from tubular member along a first and a second side of said riser and said bracket comprises an angle iron having first and second edges said edges engaging said tubular member thereby preventing relative rotation of said riser tube.
- 20 15. The washing apparatus claimed in claim 14 whereby said brackets run along substantially the entire length of said riser tube.

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16. The washing apparatus claimed in claim 8 whereby each riser tube is supported by a plurality of brackets.
17. The can washing apparatus claimed in claim 9 whereby said brackets extend beyond said second ends of said riser tubes and said brackets support said stop members

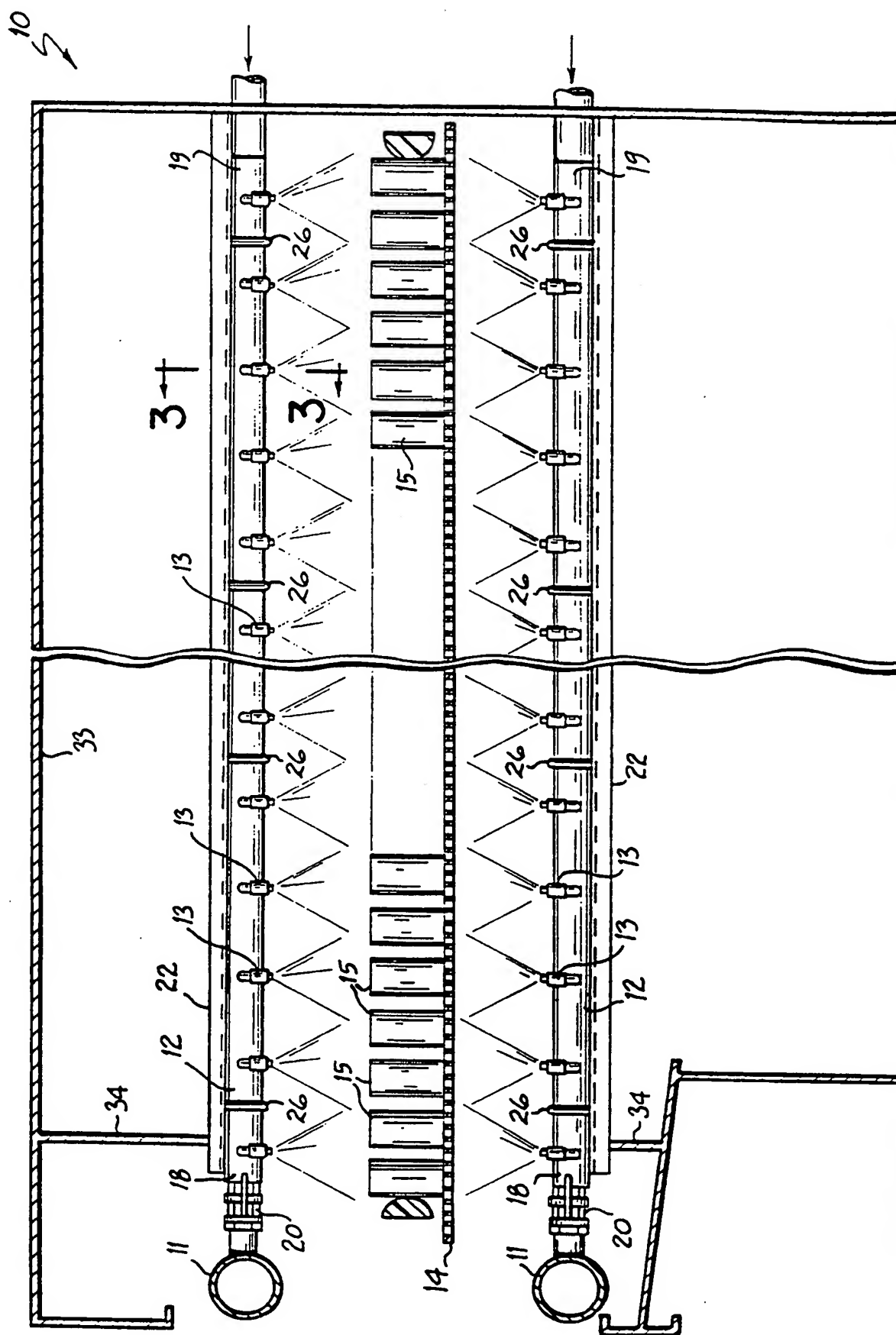
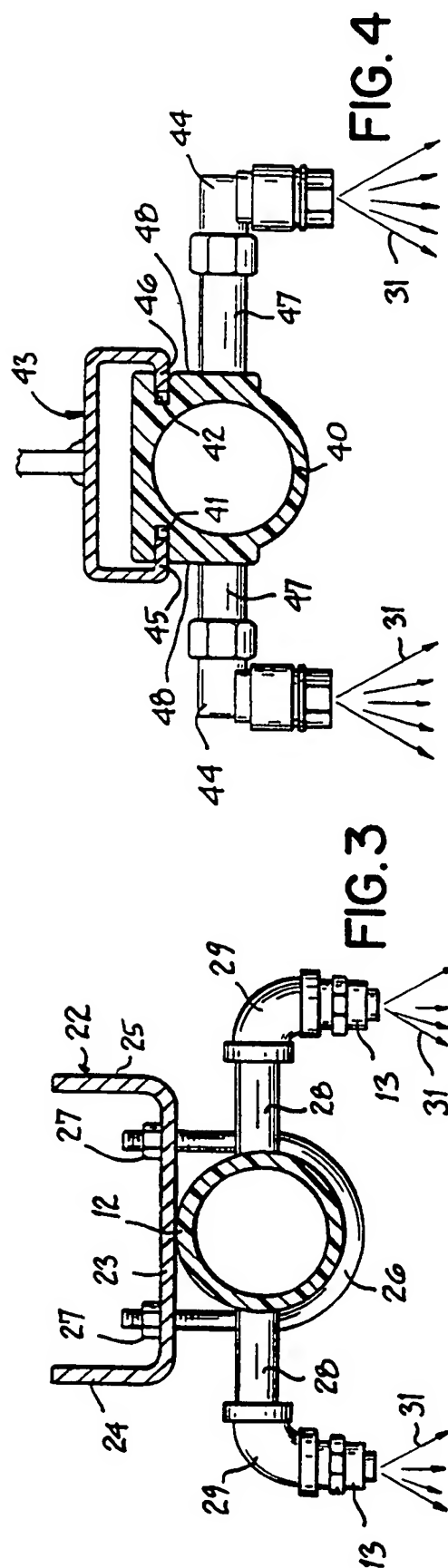
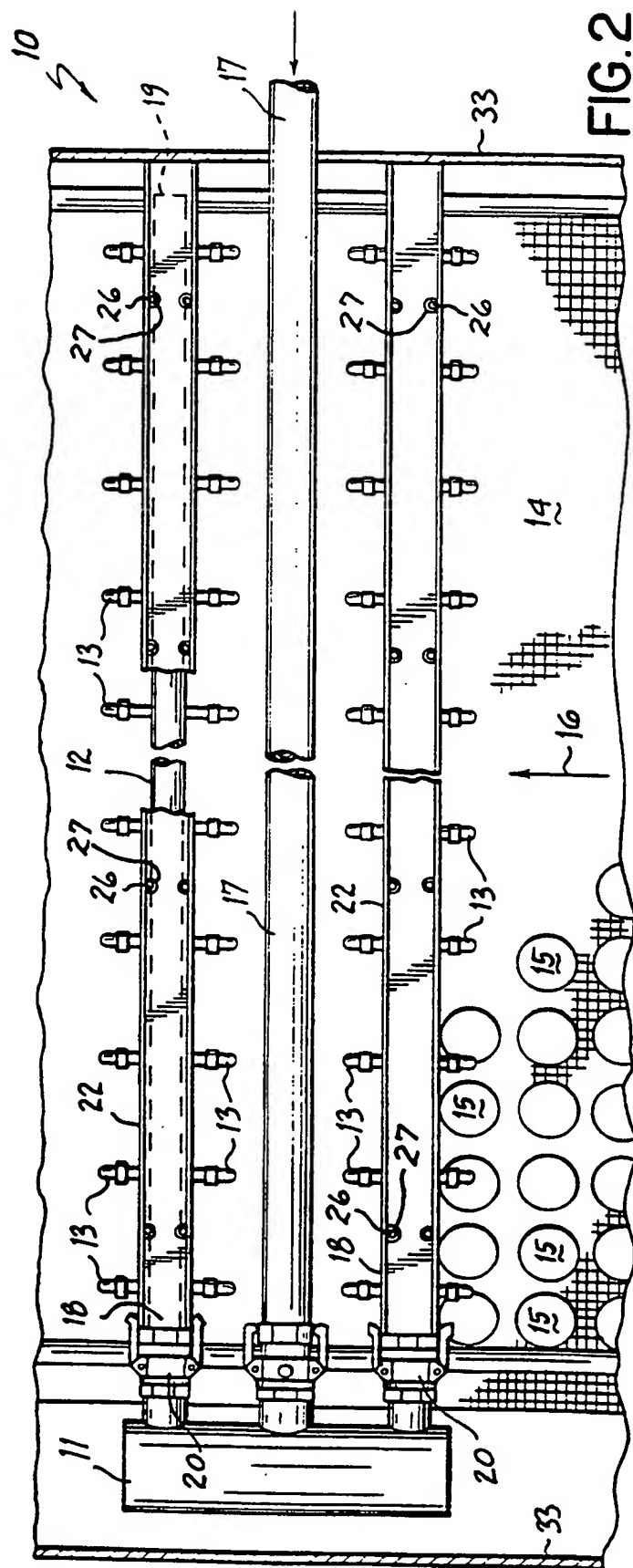


FIG. 1



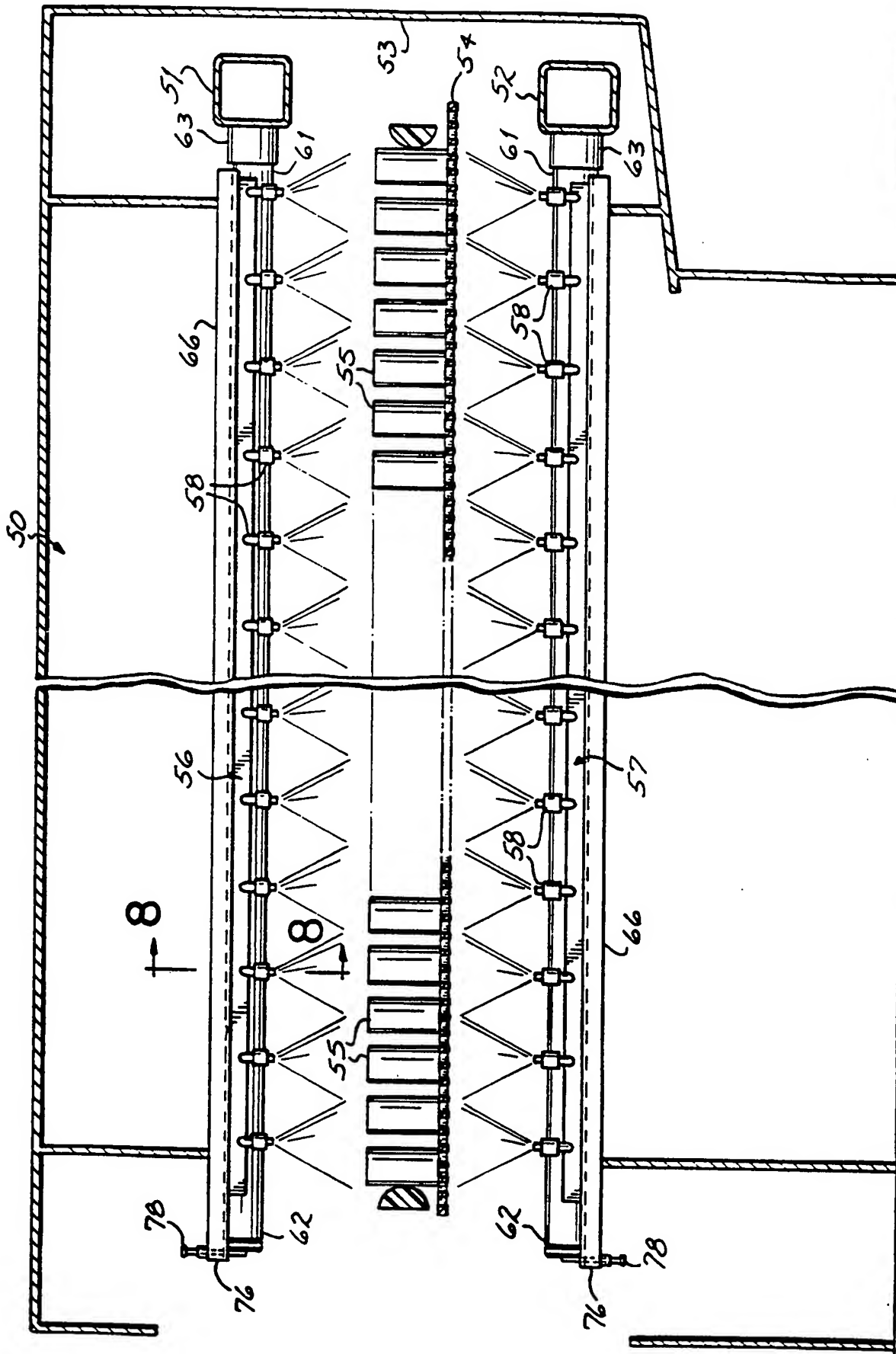


FIG. 5

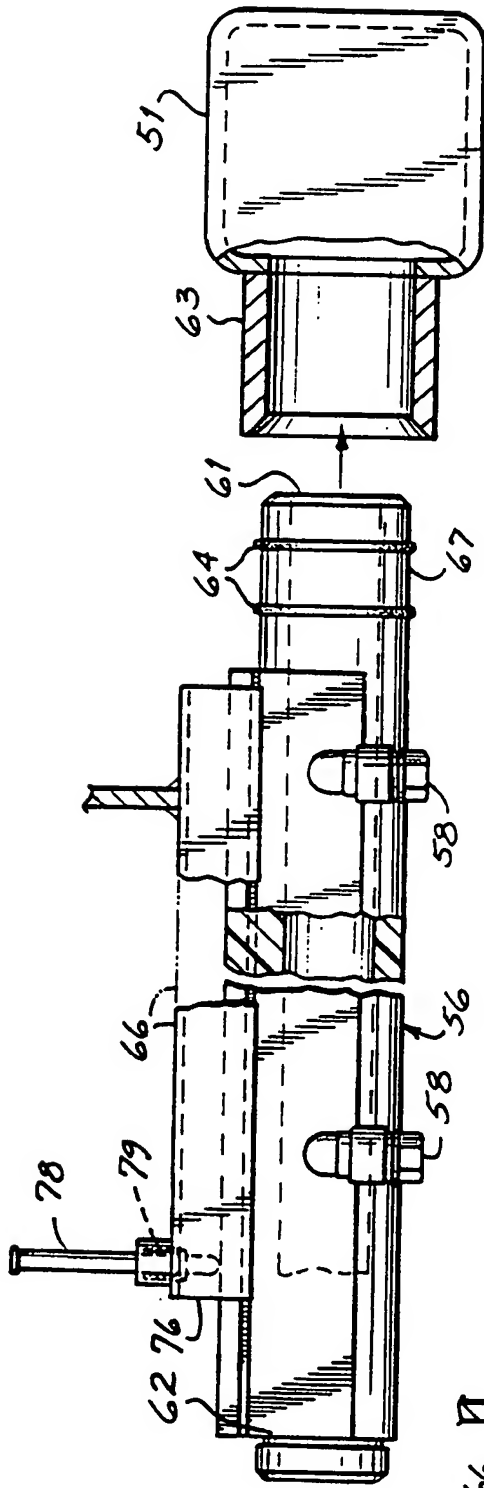


FIG. 6

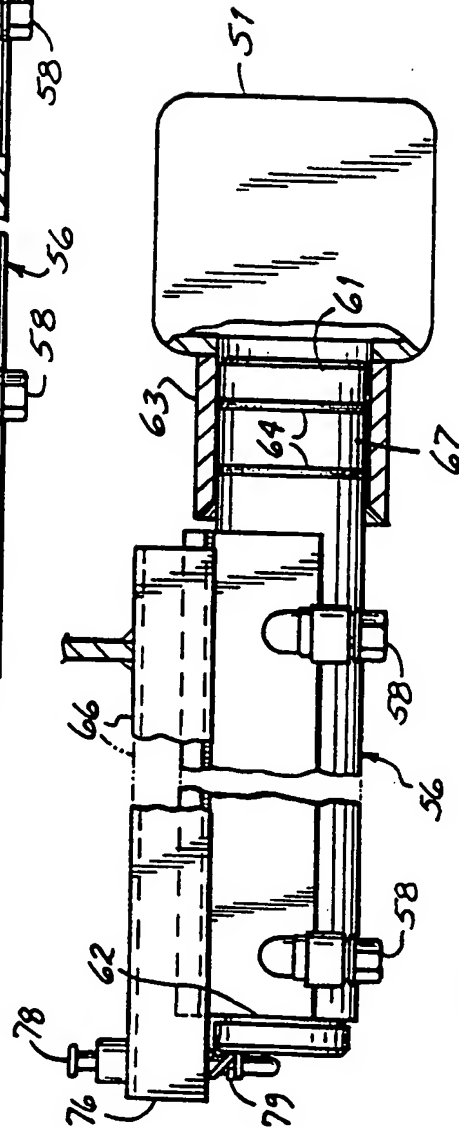


FIG. 7

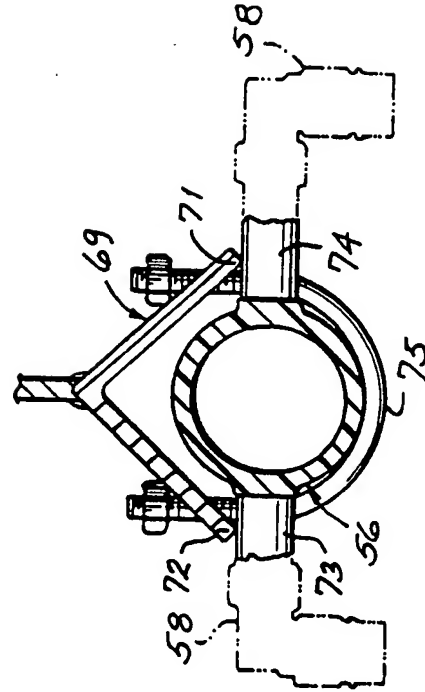


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/09389

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :B08B 3/02

US CL :134/131

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)


U.S. : 134/131, 198, 199, 64R, 122R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
NONE**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3,019,801 A (PETERSON) 06 FEBRUARY 1962.	1-17
A	US 4,125,120 A (STANDLEY) 14 NOVEMBER 1978	1-17
Y	US 5,257,739 A (PASCARU) 02 NOVEMBER 1993, see cols.1-12.	1-17
A	US 5,564,448 A (LINCLON) 15 OCTOBER 1996.	1-17
Y	US 5,660,196 A (BEIN) 26 AUGUST 1997, see cols. 1-6.	1-17

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
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Date of the actual completion of the international search 19 JUNE 1999	Date of mailing of the international search report 08 July 1999 (08.07.99)
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer  FRANKIE L. STINSON Telephone No. (703) 308-0661